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ANTONELLI, TERRY, STOUT & KRAUS, LLP  
1300 NORTH SEVENTEENTH STREET  
SUITE 1800  
ARLINGTON, VA 22209-3873

EXAMINER
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CAMPBELL, NATASHA N.

ART UNIT	PAPER NUMBER
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1714

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08/11/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/583,348	<b>Applicant(s)</b> NISHIO ET AL.	
	<b>Examiner</b> NATASHA CAMPBELL	<b>Art Unit</b> 1714	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.  
     4a) Of the above claim(s) 9-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-8 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 June 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-8, drawn to a method for removing deposit or a liquid from a substrate.

Group II, claim(s) 9-20, drawn to an apparatus for removing deposit from a substrate.

2. The groups of inventions listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

3. Both groups contain the technical feature of removing a substance from a substrate using a pair of air knives such that the fluid is discharged from the air knives and, directed, along with the substance, away from the substrate via a path between the air knives. However, this feature is not considered a special technical feature in view of Shima (JP 09-162147). Shima teaches removing processing liquid from a conveyed substrate by applying air jets from dual air knife units such that the air jets are directed toward the substrate and then are, along with the processing liquid, directed away from the substrate surface toward a path between the two adjacent air knives (see abstract; machine translation paragraphs [0040] and [0041]; and Fig. 3).

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4. During a telephone conversation with Alan Schiavelli on 08/04/2010 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-8. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

#### ***Priority***

6. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

#### ***Drawings***

7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: discharge duct **203**. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be

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labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

8. Figures 13 and 14 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

9. The disclosure is objected to because of the following informalities: Applicant has made reference to specific claim numbers within the specification section of the disclosure ([0022]-[0035]). The references should be deleted. Appropriate correction is required.

### ***Claim Objections***

10. Claim 1 is objected to because of the following informalities: The claim should be written such that the preamble is readily apparent and separate from the body of the claim, and such that the process steps intended as the limitations of the claim are

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clearly, and positively presented. Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation (see MPEP 608.01(m); 37 CFR 1375 (i)).

### ***Claim Rejections - 35 USC § 112***

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claims 3 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

13. Claim 3 recites that “a fluid that is discharged from the slit portion of one air knife unit has the appearance of a wall surface...” It is not clear how the fluid would appear as a wall. It is understood from applicant’s disclosure (e.g., para. [0056]) that the fluid can include air- therefore, it is not clear how air, being a clear gas, would appear as a wall surface. For examination purposes, the claim will be interpreted to mean that the discharged fluid *functions* as a wall or barrier upon which additional fluid- discharged from the other air knife unit- collides with.

14. Claim 7 recites that “the fluid that is discharged from the slit portions is a gas for drying a substrate and a liquid for cleaning a substrate”. It is unclear whether the limitation is intended to mean that:

(a) the fluid being discharged from each air knives is a combination of both a gas and a liquid; or

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(b) the fluid being discharged from one air knife is a gas, while the fluid discharged from another air knife is a liquid.

For examination purposes, the latter interpretation (b) will be used.

### ***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

17. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

18. Claim 1, 3, 4, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shima (JP 09-162147; machine translation attached, and used here), and further in view of Wessells et al. (US 4,197,126).

19. Regarding Claims 1 and 8: Shima teaches a method of removing a deposit from a substrate, wherein deposit that has attached to a surface of the substrate is removed from the surface using air knives in which a slit portion is formed so that a fluid (dry gas) can be discharged in band form (see Fig. 2, elements 41 a, b, c; and [0027]). Shima teaches a fluid introduction path is formed between the air knife units and the substrate surface (see downwardly-directed arrows). He teaches that a fluid is discharged toward the fluid introduction path from the air knife units, and the fluid is further passed through the introduction path and led to a wall surface that is formed to face a front portion of the air knife units (see curved arrows; [0040] and [0041]). He teaches that deposit on the substrate surface is led away from the surface, along with the fluid, via a path formed between the air knife units and the wall surface (again, see curved arrows) such that the cross section of the flow path is greater than the fluid introduction path (see Fig. 3, air knives are angled and the area between s1 and s2 is greater than the distance from the slits and the substrate surface).

20. Shima teaches that the substrate is conveyed passed the air knives, but does not teach that the air knife units move relative to the substrate. However, this alternate configuration is well known in the art, as evidenced by Wessells. Wessells teaches that



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it is well known to remove substances from the surface of a substrate by either moving substrate past a stationary air knife or moving the air knife past a stationary substrate (col. 13, lines 48-52). Therefore, one of ordinary skill in the art would have recognized the step of moving the air knife relative to the substrate surface as an obvious variant of the method performed by Shima.

21. Regarding Claim 3: Shima further teaches that the air knife units are paired in configuration (see Fig. 3). He teaches that the fluid discharged from one air knife collides with fluid discharged from the other air knife [0011], therefore the fluid acts as a wall or barrier for the second fluid. Shima also teaches that the fluid is directed away from the substrate surface (see Fig. 3, curved arrows).

22. Regarding Claim 4: Shima further teaches that the air knife units are aligned parallel to each other (see Fig. 3). It is further noted that since Shima teaches that they are parallel, and since the fluid discharged is directed up in between the parallel air knives, it is expected that the lower portion of the air knives would function as a wall surface surrounding the colliding air currents. Shima further teaches that fluid is led away from the substrate surface (see Fig. 3).

23. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shima (JP 09-162147) and Wessells et al. (US 4,197,126) as applied to claim 1 above, and further in view of Yamazaki et al. (JP 2000-146443).

24. Regarding Claim 5: Shima and Wessells teach the elements of Claim 1, as described above. They do not teach air knife units on the rear surface of the substrate.

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However, Yamakazi teaches a method for removing liquid from both surfaces of a substrate (Fig. 3). One of ordinary skill in the art at the time of the invention would have been motivated to modify the method of Shima by providing air knife units on the rear surface in order to maximize the efficiency of the method, and provide means to remove adhering deposits from both surfaces of the substrate.

25. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shima (JP 09-162147) and Wessells et al. (US 4,197,126) as applied to claim 1 above, and further in view of Kush et al. (US 4,477,287).

26. Regarding Claim 6: Shima and Wessells teach the elements of Claim 1, as described above. They do not teach that the deposit and fluid are forcefully captured by a capturing means.

27. However, in a similar method of removing liquid from a surface, an air knife is used to drive the liquid from the surface, towards a vacuum unit which then removes the liquid (see abstract and Fig. 4) before re-deposition occurs. Therefore, one of ordinary skill in the art at the time of the invention would have been motivated to modify the method of Shima by providing means to capture the fluid and deposit in order to avoid re-deposition on the surface.

28. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shima (JP 09-162147; machine translation attached, and used here) and Wessells et al. (US

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4,197,126) as applied to claim 1 above, and further in view of Mertens et al. (US 2002/0148483).

29. Regarding Claim 7: Shima and Wessells teach the elements of Claim 1, as described above. Shima teaches that the discharged fluid is a gas for drying a substrate [0012]. The prior art does not teach that liquid for cleaning the substrate is also discharged. However, in a method of removing a liquid from a substrate, Mertens teaches that a cleaning liquid is supplied on the substrate surface from a nozzle, and a drying gas is simultaneously supplied to the substrate surface (see abstract and [0012]). Mertens teaches that the nozzles for discharging both fluids are parallel to each other (Fig. 1), and teaches that this process improves both cleaning and drying efficiency [0036]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Shima by discharging a cleaning fluid along with the drying fluid, as taught by Mertens, in order to enhance the cleaning and drying efficiency.

### ***Allowable Subject Matter***

30. Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

31. The following is a statement of reasons for the indication of allowable subject matter: The reviewed prior art does not disclose or render obvious a method of removing a deposit from a substrate using air knife units wherein the clearance between

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the air knife units and the substrate surface is adjusted using the Venturi effect between the air knives and the surface when the fluid passes through the fluid lead-out path, and thereby, the air knife units are supported relative to the surface in such a manner as to fluctuate.

32. The closest prior art of record is Shima (JP 09-162147) which discloses removing deposits from substrate surfaces with the use of air knife units, as described above.

Shima does not teach fluctuating or adjusting the distance between the air knives and the substrate surface using the Venturi effect as described and claimed.

### ***Conclusion***

33. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATASHA CAMPBELL whose telephone number is (571)270-7382. The examiner can normally be reached on Monday-Friday; 9 AM-5 PM.

34. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on (571) 272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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35. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. C./

Examiner, Art Unit 1714

09 August 2010

/Michael Kornakov/

Supervisory Patent Examiner, Art Unit 1714